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AUTHOR Vaughan, Larry
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ABSTRACT

This paper summarizes the general issues discussed at the September 1986 conference of the Apple Education Advisory Council and during the Advisory Council's deliberations about the future. The general issues are categorized within four topics--technical considerations, people considerations, human/technology interface considerations, and network utilization--and specific suggestions are made for each of the topics. In general, it is argued that educators and administrators should be planning how to network people rather than technologies. Risks must be taken, it is suggested, and new projects must be developed and evaluated so that lessons learned can be brought forward into the design of future systems. Finally, it is argued that future-oriented models of networking must be process models so that future systems can be redesigned readily as they are being built. (EW)

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Visions of the Future

Considerations for Shaping Educational Networking

Larry Vaughan

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Introduction

When the Apple Education Advisory Council met in September, 1986 and contemplated issues around future networking, the discussion was more than just an exercise in guessing what things will look like down the road. Sure, it's true that educational administrators don't have a handle on current technological networking opportunities. And, yes, it's also true that only a very small proportion of administrators are using electronic networking at all; and most of those users are underutilizing it. The fact is that the vast majority of educational administrators are either unaware that networks exist or have no idea what they might gain by using them. Even the Advisory Council members with our broad-based experience in networking had trouble reaching consensus views about existing networks.

If all this is true, then why fuss about future networks for educators? Because even though we don't have all the answers for existing networks, we've got to start sorting out what we want the future to look like, if we hope to have any chance of shaping it.

We can agree on some things. Access to good information is essential to good decision making in educational administration or any other arena. The sheer volume of information is overwhelming and increasing in geometric progression. Educators, particularly administrators, are isolated and need to make independent and informed decisions. Educators need some kind of system to share information.

Educators are not alone in considering the future of networking. Clear vision has not yet resulted from ongoing consideration of dilemmas in the corporate networking world. Recently Stuart Mathison, vice president of special projects for Telenet, said, "Last year we agreed that the industry's biggest challenge was to turn mailbox subscribers into users. According to industry reports, this is still our biggest challenge." But in a recent study conducted by Dataquest on why people want to participate in electronic networking, the following were the most frequently cited reasons:

- Information sharing 45%
- Data base access 24%
- Mainframe access 17%
- Exchanging data 17%
- Electronic mail 10%

I'll put money on the proposition that educators' reasons for wanting to connect are quite similar to these. Educators interested in electronic networking want to get information from peers who can help them in their own decision making. Before we become too worried about turning subscribers into users, however, we have to demonstrate what benefits educators can expect to derive from networking and then persuade them to subscribe.

The Advisory Council's deliberations about the future had to get down to the basics. We knew that the who, what, when, where, why, and how of future networking were important. The "who" seemed fairly clear: Administrators must demonstrate the utility of networking so that its function would become legitimate and be budgeted before networking could become more widely available to the larger educational community. The council also had some overall consensus on the "what"—information for decision making. The "when" seemed to be derived from the frequency of the need—probably daily in the future. I agree with the several Advisory Council members who insisted that the "where" had to be right on the administrator's desk, and not only on his/her secretary's desk. The "why" seems to be related to general information sharing aimed at decision making. Although the "how" is much less clear, everyone agreed that networking must be very easy (superfriendly with transparent access to multiple networks).

Before laying out specifications for future educational networking, the council addressed some other general issues. Educators and administrators should be planning how to network people, not technologies. If we can develop a clearer vision of the issues involved in networking people, the technology can be developed to address the vision. We must take risks, pilot new networking applications, evaluate the use of networking, and take these lessons forward into the design of future systems. All future-oriented models of networking must be process models so that future systems can readily be redesigned as we are building them.

As is now the case, costs will be a major consideration in the future. However costs shake out in the future, they will not be easy to justify if the networking services do not make the educational administrator's job easier and allow the generalized perception of increased effectiveness. Also, it is likely that we have the wrong financial models to support educational technology development programs. We need to reallocate and create new resources (human, technological, fiscal) in order for education to provide for this development.

Much of the discussion of the Apple Education Advisory Council meeting about future networking could be categorized within the following topics:

- Technical considerations
- People considerations
- Human/technology interface considerations
- Network utilization

These issues are discussed in the sections that follow.

Technical Considerations

Will future networks be multimedia configurations that coincidentally capitalize on graphic images, sound, and text? How might these multimedia configurations influence our use of networks in the future? What can we do now to effect a smooth transition from current technologies to those in the future? We must plan to provide support of the evolutionary steps between today's and tomorrow's technology while effectively serving the current installed base of network users. Can we envision an overall communications system instead of partitioned components (voice, images, data)? How can technical considerations be managed to minimize cost-versus-use limitations? Future technology in networking must provide for:

- Seamless movement across networks
- Standardization in user interface
- Simplicity in use (telephone analogy)
- Cross-hardware compatibility
- Access and control of information
- Minimization of training needs

People Considerations

How can we demonstrate to leadership (those in charge of authorization and appropriation) that networking makes a difference? Can increased awareness lead to pilots, acceptance, and replication? How can we assure that training needs are minimal, and that training will always be available to break through "the wall" of the learning threshold? System design should eliminate the need for training on how to operate hardware and software so that training can focus on the realm of the possible: What are the ways we can use networking to solve problems? How can we come to understand the global organizational and human change processes necessary to implement the vision of educational transformation? How can systems be designed to induce creativity in networking practice? Do we need intelligent systems that can manage and/or control the flow of information? How can future systems empower educational leadership? For future networks to be effective, they must be designed to:

- Adapt technology for education
- Serve multiple levels of decision making
- Relieve impacts on the schooling process
- Make human expertise more widely available
- Protect original sources of information
- Allow sufficient security to protect people and institutions

Human/Technology Interface Considerations

Ease of use will promote further utilization, but how can the interface be standardized across information sources and hardware? If most educators don't understand technology and most technologists don't understand education, how can we bring them together to establish useful interface protocols? Humans and institutions (particularly educational ones) tend to resist change; how can training overcome this resistance? We must work effectively to design systems that:

- Appear totally transparent to movement across subnetworks
- Are as easy to use as telephones
- Do not create fear among intended users
- Present a low-risk method of information support
- Provide a cost-effective alternative to present communication methods
- Can help us filter the flood of information

Network Utilization

If people don't use effectively the networks that exist today, how can we expect them to use future networks effectively? How can we demonstrate the needs persuasively enough to assure the level of use that is necessary to make a broad-based network effective? Costs, both startup and ongoing, inhibit use today—can we overcome this problem in the future? To move toward an appropriate level of utilization in the future, systems must be designed to:

- Self-validate their utility and usefulness
- Provide a universal standard interface
- Be viewed as a process, not a product
- Empower the user
- Provide desirable cost/benefit factors
- Lead humans to better decisions

While the members of the Apple Education Advisory Council covered a lot of turf in discussing future networking for educators, we barely skimmed the surface of the topics that were identified; and we are certain that we failed to identify many areas that will be pertinent to the design of future systems. As one member of the council said, "The nature of knowledge and knowing has changed, and we haven't adjusted yet." We must come to grips with that in the future. We have many dilemmas. For instance, reaching short-term goals involves operating within existing structures, while reaching long-term goals involves putting energy into a process that may be counter-productive to short-term goals. We must come to think of information as dealing with the dynamic rather than the static. We don't even have a metaphor for how we really want to be linked. What is the nature of the gateways that must be created to make our networking really useful? What user-generated data bases are needed to maximize utility? Politics exist in every arena, and will certainly have a major impact on the design of future networking solutions for education. How will politics influence integration and expansion of curriculum for our schools?

Surely, we are now witnessing the shrinking of the world, but not of its base of information. What issues must we consider about access to and freedom of information? When can we expect the educational community to understand the networking medium? What are the major ethical considerations? Are we misleading ourselves; are networks just tools in search of a task? How can we overcome the pervasive fear of information-sharing utilities? Is there real utility or just romance? There is a perceived designer-versus-user conflict, and we must bridge the gap.

I think the council left Cupertino with the feeling that it would be possible to build road maps toward solutions; it will take leadership, compromise, and actual networking among educators. The leadership will have to create, support, and disseminate multiple models and pilots of what can work. Leaders can sense needs and get an endorsed vision of what the educational community wants. They can look to business to learn of the successful models used there and use these models to influence development in education circles. We will have to compromise with all of the stakeholders.

Standards must be set. We will have to learn to accept, even welcome, a dynamic environment. Full development must become a distributed process. To develop networking we must network. How can we create widespread access to a variety of models? How can we stimulate interaction between the producers and consumers of networking? Can we learn to become our own producers?

As we reflect on the promise of future networking solutions, we must admit that there is a dichotomy between technology that exists, which we don't use well, and technology that doesn't exist, which we need. All of the problems of present and future networks are problems because they limit who can participate and at what level.

Not everybody is ready for networking. Many can cite the benefits of networking, but some of these same people are not yet using it productively. What is the answer? How do we go about building the kind of perspective we want educators to have? Today, I think experience is the only answer. Sometime, at some point, a bulb is lit and someone says, "Aha, I could do this with that." All of us need more "aha's." Let's expand our horizons.

As I write this manuscript, pilot projects are underway. I am personally involved in two such projects that connect groups of superintendents in the New England area. It is clear that these projects are changing the way superintendents look at their work. Project participants are using the networks to advertise professional vacancies, ask for help on curriculum issues, seek guidance from their peers about policy issues, and check out the general educational climate relative to specific issues. Such information access is long overdue. The experience and insight we all gain through this and other bold pilot projects will influence our visions for educational networking.